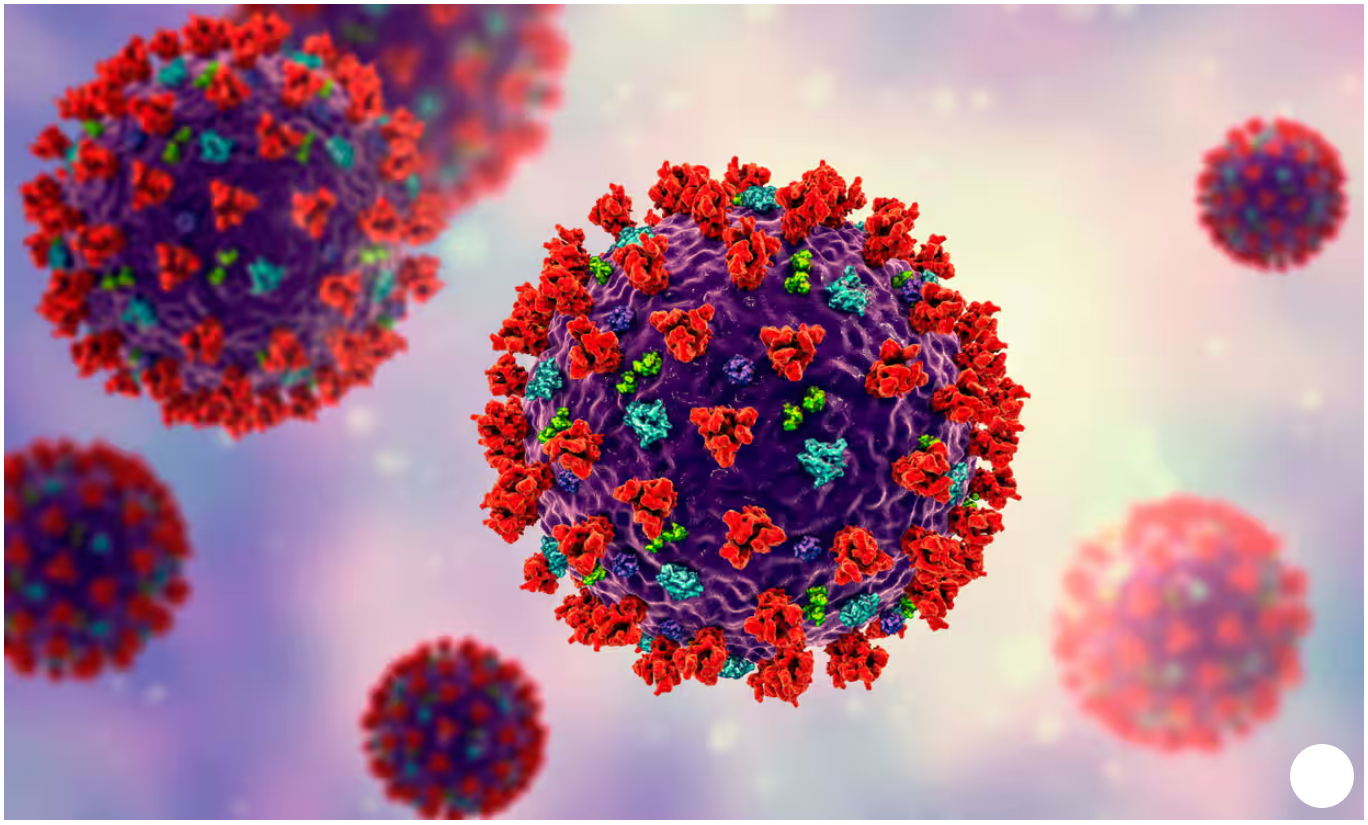

Coronavirus

Severe Covid infections can inflame brain's 'control centre', research says

Scans of people hospitalised with Covid may explain the long-term breathlessness and fatigue some patients experience

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Tue 8 Oct 2024 00.01 BST

Severe Covid infections can drive inflammation in the brain's "control centre", researchers say, leading to damage that may explain the long-term breathlessness, fatigue and anxiety some patients experience.

High-resolution MRI scans of 30 people hospitalised with Covid early in the pandemic, before the introduction of vaccines, found signs of inflammation in the brainstem, a small but critical structure that governs life-sustaining bodily functions such as breathing, heart rate and blood pressure.

The scans suggest that severe Covid infections can provoke an immune reaction which inflames the brainstem, with the resulting damage producing symptoms that can last for months after patients have been discharged.

"The fact that we see abnormalities in the parts of the brain associated with breathing strongly suggests that long-lasting symptoms are an effect of inflammation in the brainstem following Covid-19 infection," said Dr Catarina Rua, a neuroscientist at the University of Cambridge and first author on the study.

The project was launched before researchers and public health officials knew about long Covid, the chronic post-viral illness estimated to affect 2 million people in England and Scotland and tens of millions globally. But many people with long Covid report breathlessness and fatigue, raising the possibility that brain inflammation could be involved in their symptoms, too.

"We didn't study people with long Covid, but they do often have long-lasting effects of breathlessness and fatigue, which are similar to the symptoms these very severely affected people had six months after they were hospitalised," Rua said. "It does lead us to ask the question, do people with long Covid have any brainstem changes?"

Rua and her colleagues used powerful 7 Tesla MRI scanners to image the patients' brains. These revealed enough detail to see inflammation and microstructural abnormalities in the brainstem tissue. All of the patients had been admitted to hospital with severe Covid near the start of the pandemic.

The scans highlighted abnormalities linked to inflammation in multiple parts of the brainstem, starting several weeks after patients were admitted to hospital. The damage was still evident in scans more than six months later.

Damage to the brainstem might also contribute to the mental health problems some patients face after Covid infection. Of the patients in the study, those with the highest levels of brainstem inflammation had the most severe physical symptoms and the highest levels of depression and anxiety, according to the study published in Brain.

"While this study does not conclusively prove the causes of long Covid, it does point a finger at one possible suspect for some of the symptoms experienced," said Paul Mullins, a professor in neuroimaging at the University of Bangor. "It is not clear that this shows much in the way of possible treatments for long Covid once it has occurred, but it perhaps does point to the need to reduce inflammatory responses during initial Covid infection and response."

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